

Welcome Sediment Workgroup Members and Audience!

December 2, 2009

Revisions to Sediment Management Standards Human Health and Background

Discussion of options

Chance Asher
Sediment Workgroup
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Ecology subgroup members

Pete Adolphson

Brendan Dowling

Brad Helland

Laura Inouye

Fu-Shin Lee

Russ McMillan

Donna Podger

Dave Sternberg

Outline

- Problem statement
- Differences between SMS and MTCA
- Options description
- Discussion

Objectives for Presentation/Discussion

- Explain Ecology thinking and details of identified options.
- We're not finished. We need your technical, scientific, regulatory and policy expertise.
- Identify fatal flaws.
- Identify areas for further work.
- Other options we haven't considered.

Human Health & Background

Two intertwined issues

- What rule revisions are needed to provide clear and predictable sediment cleanup standards that protect *human health* at contaminated sediment sites?
- How are contaminant *background* concentrations considered in setting sediment cleanup standards?

Differences between SMS and MTCA

- SMS: Cost and feasibility in setting cleanup standards.
- SMS: Human health narrative “no significant human health threats”.
- MTCA: Natural contaminant background consideration for setting cleanup standards.
- MTCA: Cost considered when analyzing alternatives.

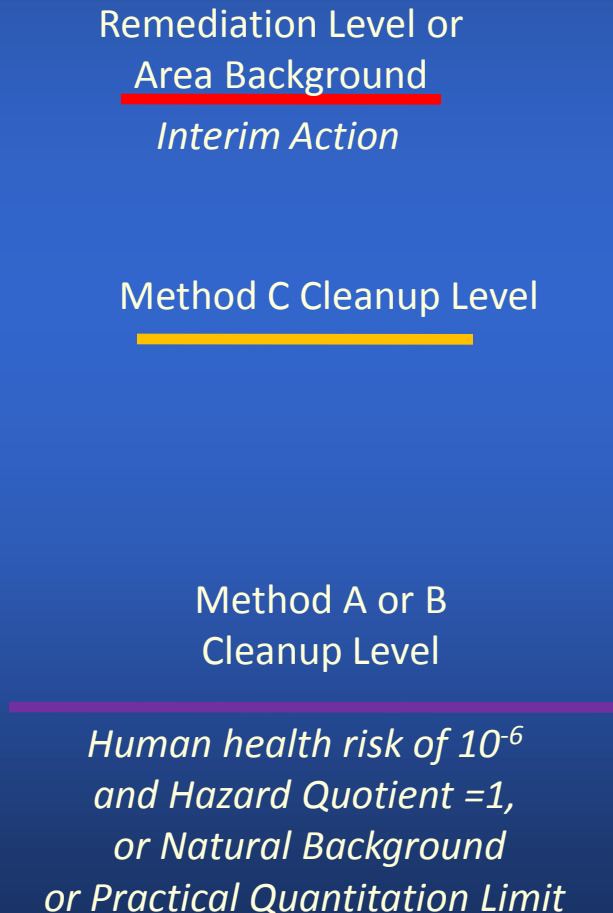
Proposed Approach

- Figure out how to determine human health protection and incorporate background to set cleanup levels at sediment cleanup sites.
- Some parts will be guidance, links to references.
- Some parts rule revision.
 - Decision making framework
 - Level of protection
 - Background definition

Current approaches for a single contaminant

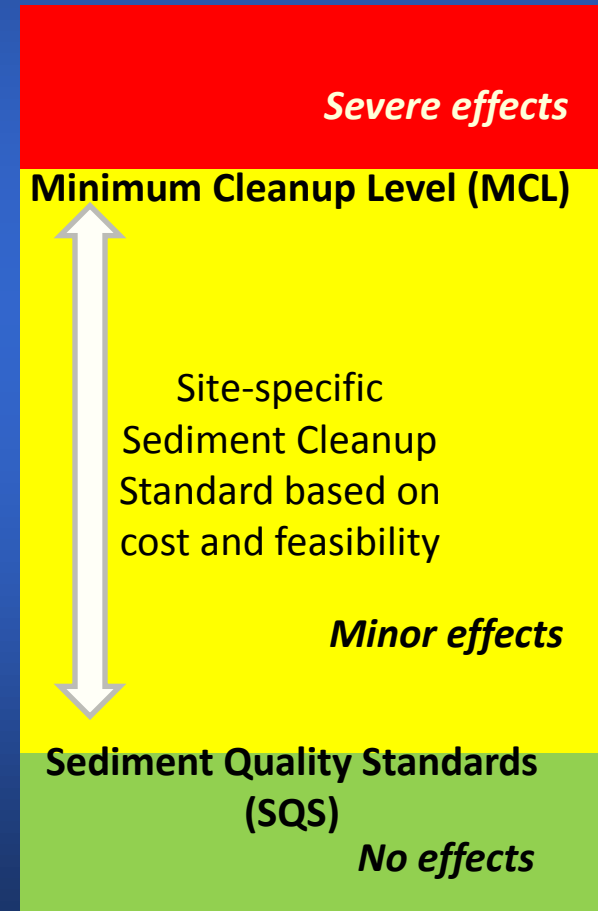
MTCA

MTCA has a single cleanup level, but land-use restrictions or compliance points allow some flexibility.



SMS

SMS uses a range for **benthic toxicity**. A site-specific cleanup standard is determined, allowing some minor effects.



Potential frameworks for human health

Single cleanup
standard

or

Range

Human health
upper level

Site-specific
Sediment Cleanup Standard
within an allowable range.

Sediment Cleanup Standard

Human health
lower level

Framework – Simple Comparison

Single cleanup standard

- Less flexible.
- Less complex.
- No consideration of cost and feasibility.
- May be more protective, but less feasible.
- May result in fewer completed cleanups.

Cleanup standard range

- More flexible.
- More complex.
- Can consider cost and feasibility.
- May be less protective, but more feasible.
- May result in more completed cleanups reducing overall risk.

Background Concentrations

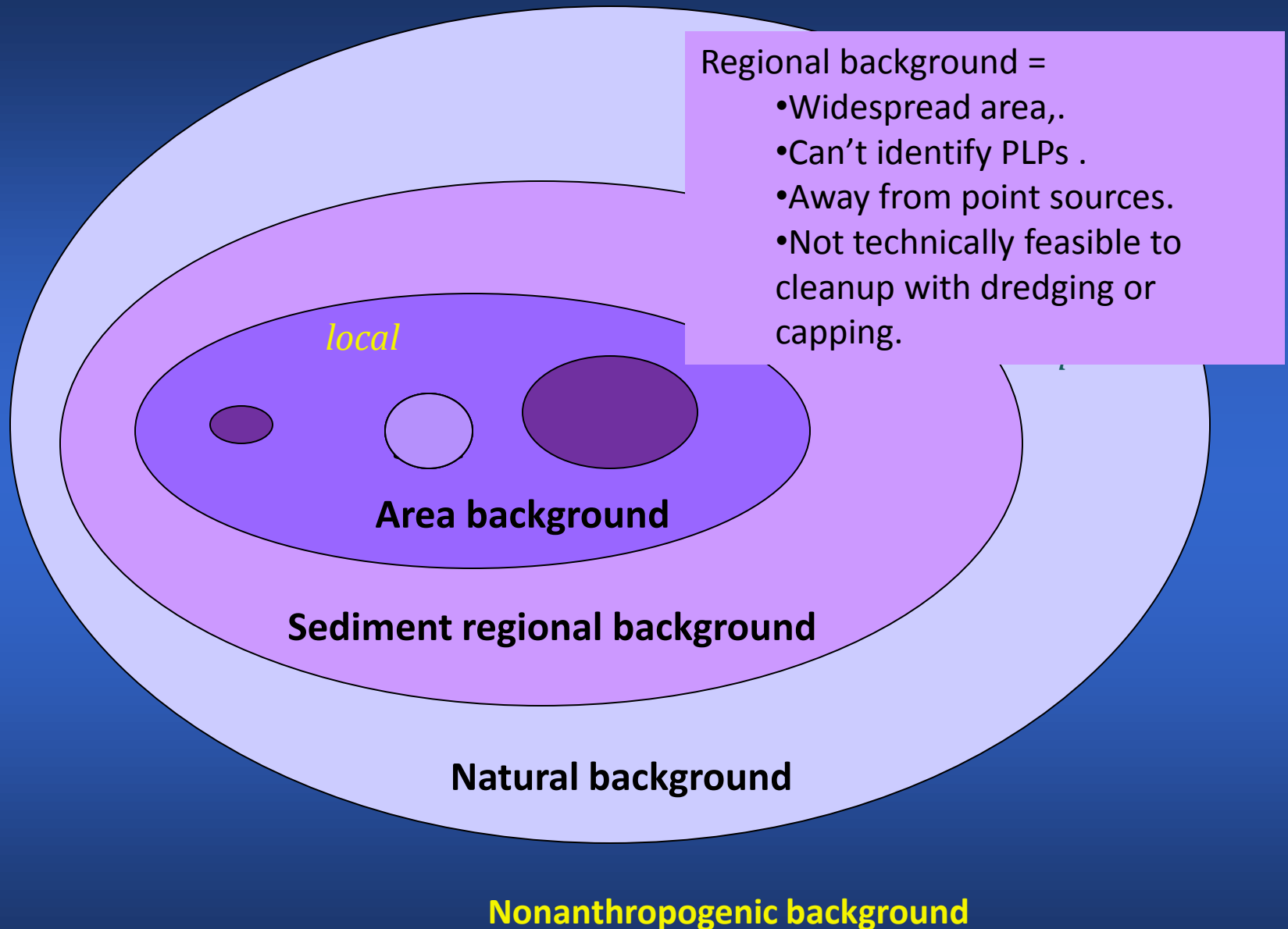
What To Keep In Mind

- Acceptable risk concentrations for some contaminants are below background levels.
- Background (natural or regional) is contamination that is widespread and not feasible to remediate.
- Sediment background is more difficult to determine than soil background.
- SMS and MTCA are different in how they handle background.

Level of Protection Possibilities (?)

- MTCA Risk Levels and Hazard Quotient
- USEPA Risk Levels
- Reasonable Maximum Exposure
- PQL
- Nonanthropogenic background
- **Natural background***
- Regional background
- **Area background***
- Habitat stratified
- AKART background

* Currently defined in MTCA



Option 1: MTCA Rule Approach

Lowest concentration based on
risk level or hazard quotient
for reasonable maximum exposure
of most sensitive population.

1×10^{-6}

single carcinogen
single exposure pathway

1×10^{-5}

all carcinogen chemicals combined
multiple exposure pathways

Hazard quotient of 1
single non-carcinogens
single exposure pathways

Hazard index of 1
multiple non-carcinogens
multiple exposure pathways

Option 1 - MTCA Rule Approach

Highest of:

- Risk-based concentration
- Natural background
- Practical Quantitation Limit

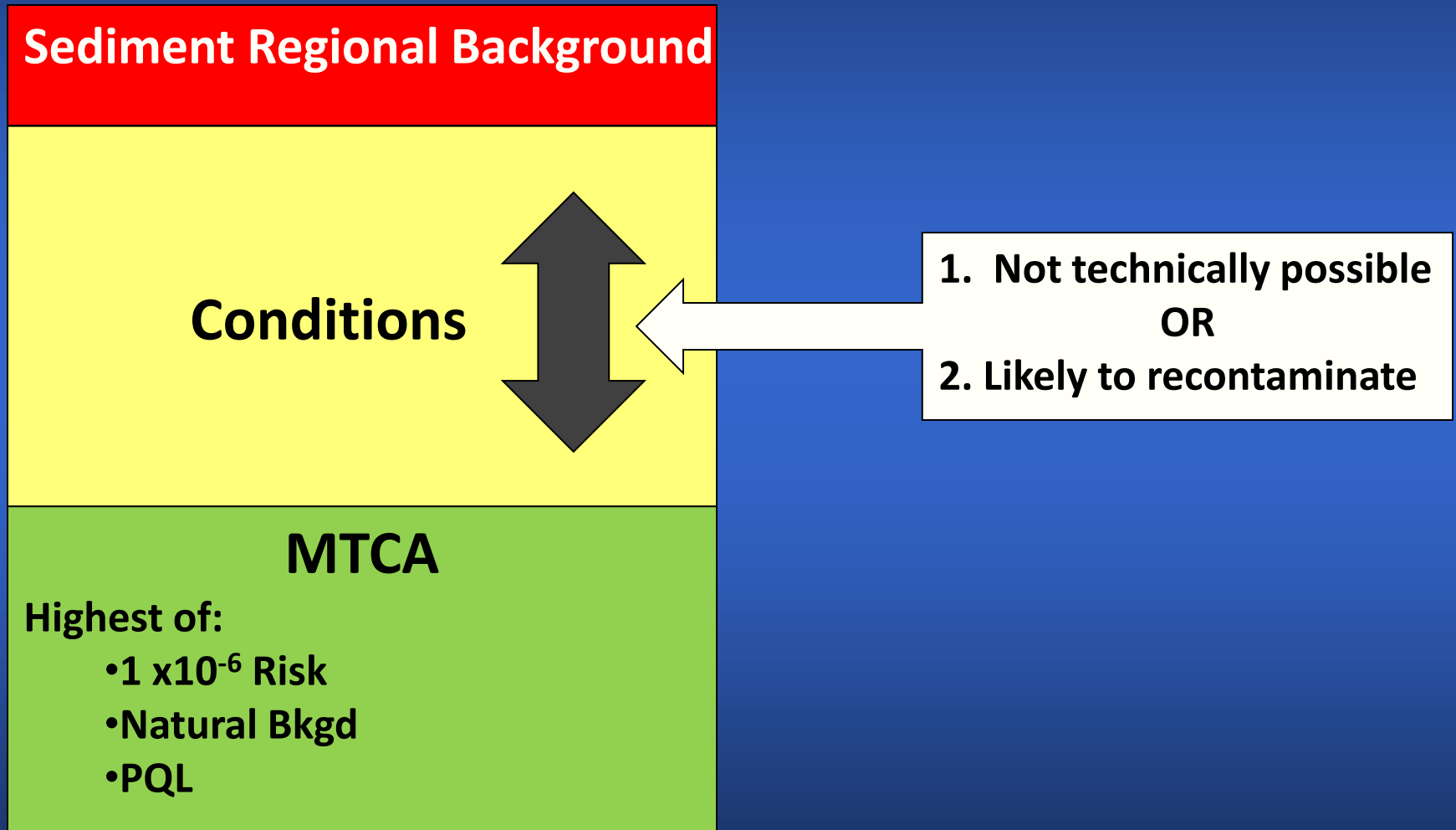
Option 1: includes alternative \approx MTCA Method C*

Can go up to 1×10^{-5} risk level for single carcinogen if:

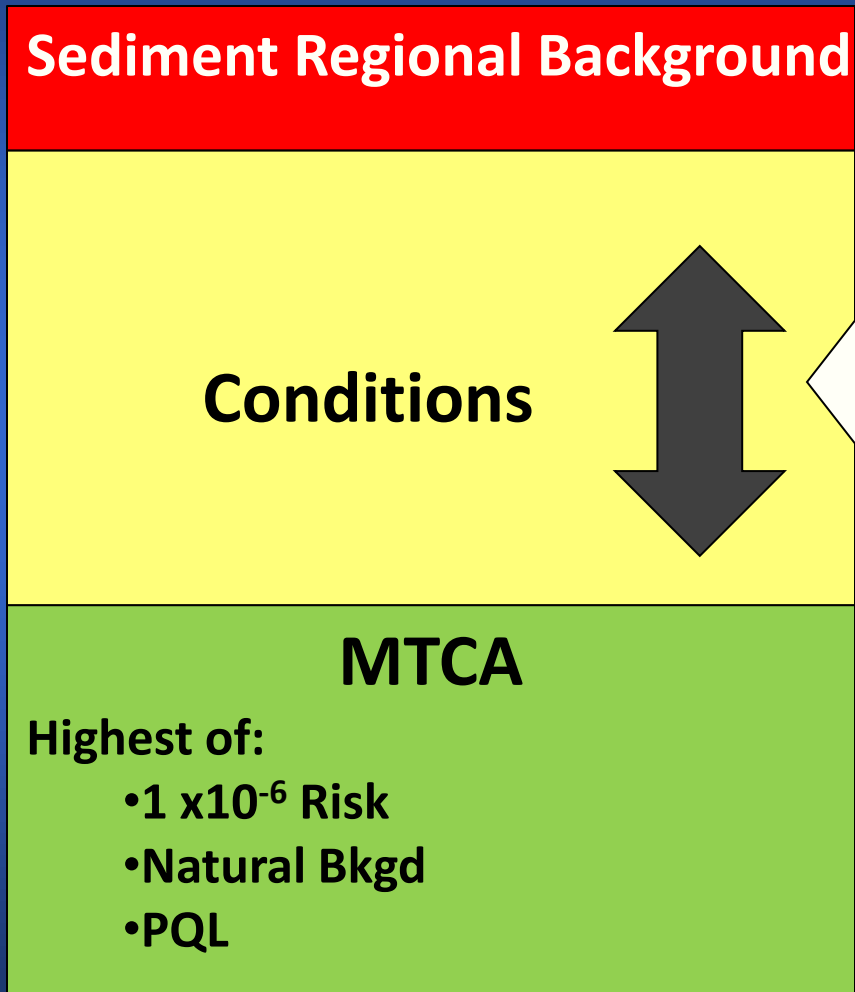
- Still at or below area background.
- If greater overall threat to achieve lower level.
- Not technically possible to meet cleanup standard.

* WAC 173-340-706 (1)(a) applies to surface water, ground water and air.

Option 2 - Conditional Range

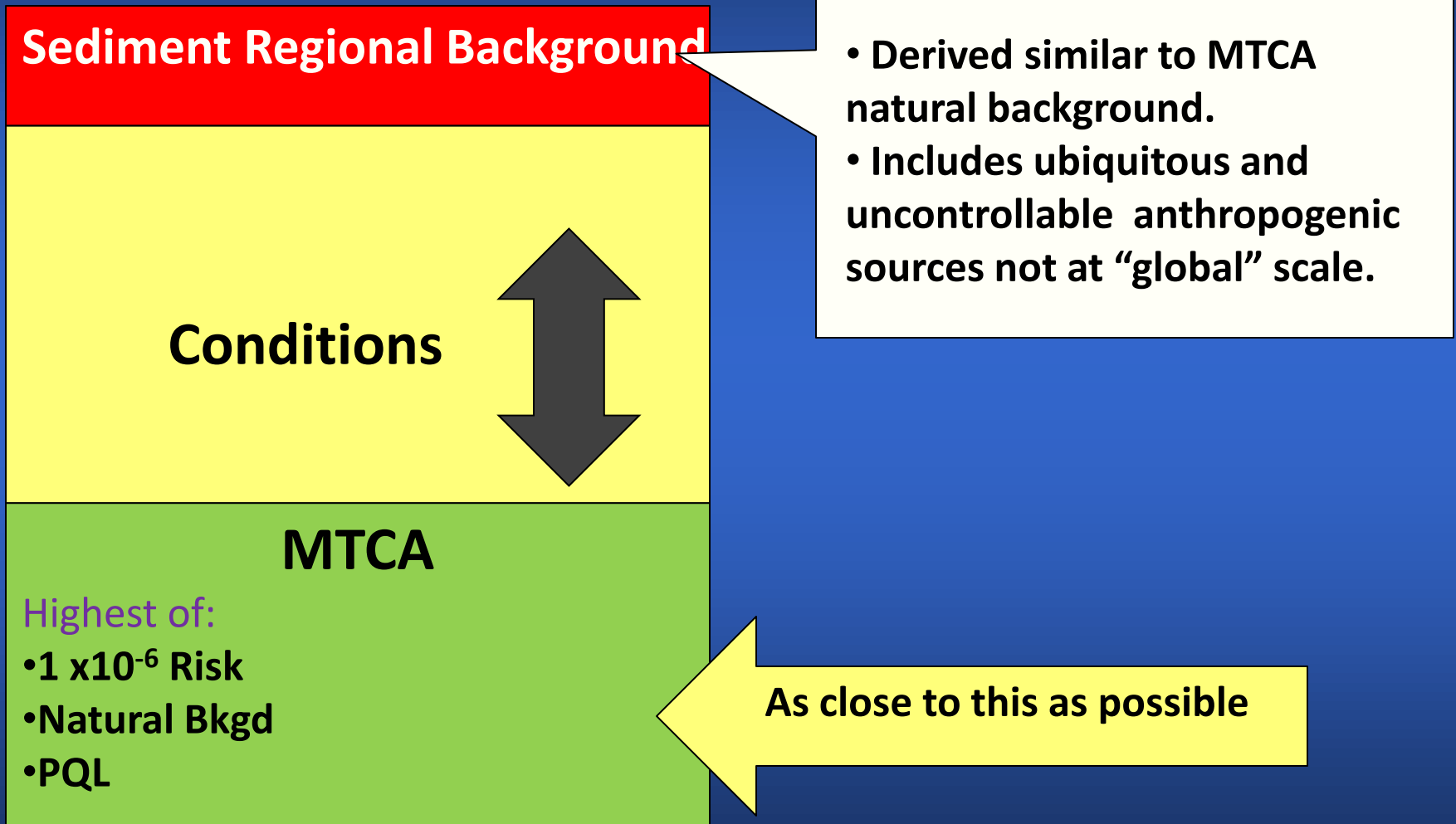


Option 2 - Conditional Range



1. Not technically possible
OR
2. Likely to recontaminate
AND
 - a. Recontamination is not from PLP –onsite source
 - b. Significant, identifiable sources controlled to extent possible.

Option 2 - Conditional Range



Sediment Regional Background

- *Definition = Hydrodynamically defined area based on mechanisms of contribution and distribution of persistent, ubiquitous and uncontrollable contaminants.*
- Location – allow some urban bay data, away from point sources and hotspots.
- Statistical comparison of background and site datasets.
- Not applicable in all areas or for all chemicals.

Option 1 – (MTCA) Advantages

- How we do it now. Consistent with MTCA approach.
- Media at site treated in same manner except benthic toxicity in sediment.
- Simplified process relative to other options.
- May be able to achieve low cleanup levels with dredging and capping.
- May result in lower cleanup standards.

Option 1 (MTCA) Disadvantages

- Will not be technically possible to achieve at some sites, may be very expensive, may recontaminate.
- May result in many interim actions where final cleanup levels are not achieved. Reduces incentive for PLP, creates more workload for staff.
- Risk reduction is “on paper” only if cleanup is delayed, is only an interim action, or the area recontaminates. Raises false expectations with stakeholders.

Option 2 – Conditional Range Advantages

- Flexibility and more feasible cleanup standards.
- Simplified process for some sites – more complex for sites that want higher standard.
- Won't spend money to get a site “really clean” then have recontaminated.
- Can resolve liability if PLP's have done everything technically possible to cleanup a site.
- Provides incentive to identify and control sources of recontamination.

Option 2 – Conditional Range

Disadvantages

- Cleanup standards will be higher at some sites.
- Approach not completely consistent with either MTCA or the SMS benthic toxicity.
- Complexity – more data and analysis, harder to understand.
- Cost and workload to identify and control sources of contamination.
- Complexity of some of the conditions, terms.

Cleanup Standards Decision Making – Option 1

MTCA

Soil
Water

Remediation Level or
Area Background

Interim Action

Method C Cleanup Level

Method A or B
Cleanup Level

*Human health risk of 10^{-6}
and Hazard Quotient =1,
or Natural Background
or Practical Quantitation Limit*

Sediment
Human Health

Method C Cleanup Level

Human Health Cleanup Standard

Highest of:

- 1×10^{-6} Risk
- Natural Bkgd
- PQL

SMS

Sediment
Benthic toxicity

Minimum Cleanup Level (MCL)



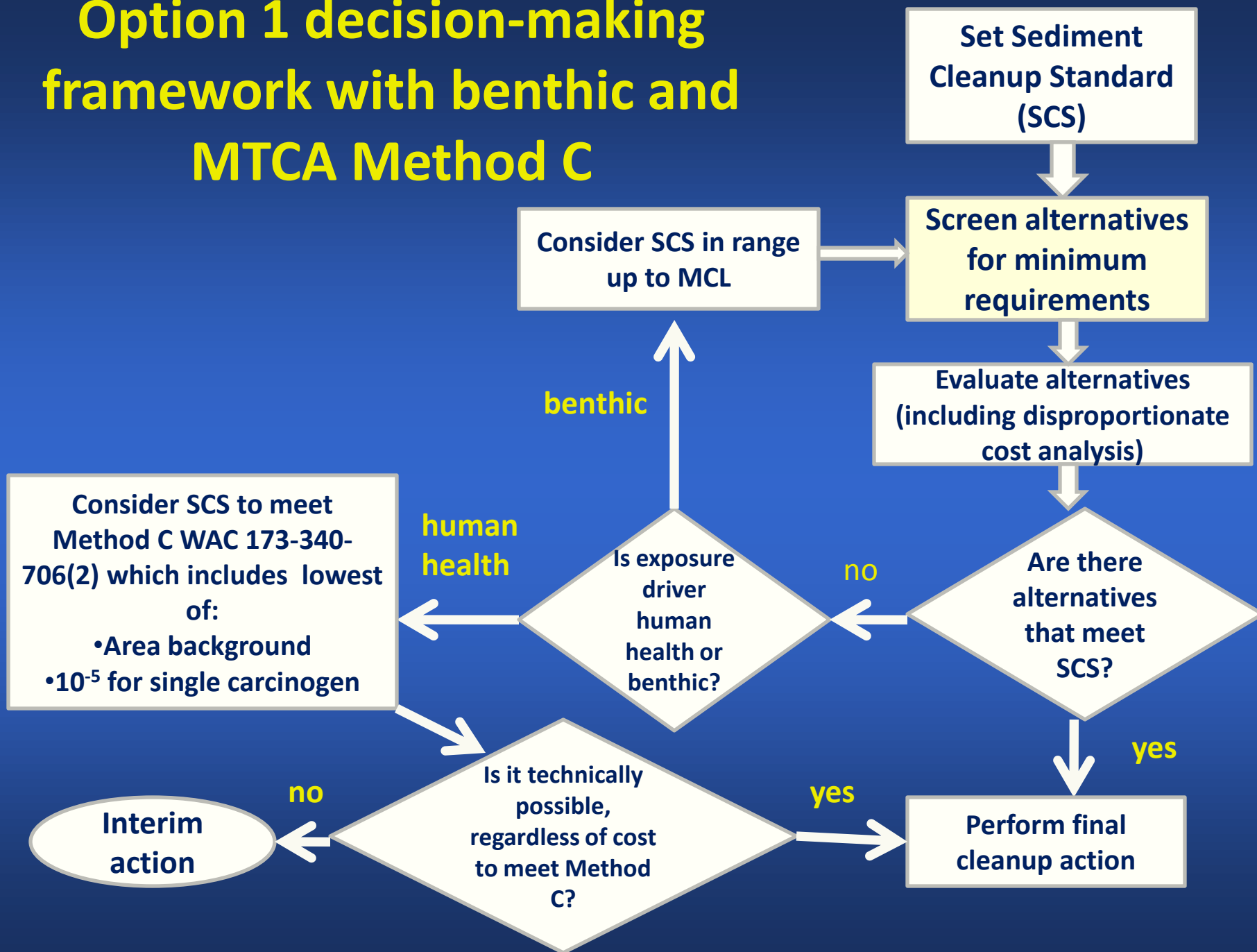
Cost and feasibility

Minor effects

**Sediment Quality Standards
(SQS)**

No effects

Option 1 decision-making framework with benthic and MTCA Method C



Cleanup Standards Decision Making – Option 2

MTCA

Soil
Water

Remediation Level or
Area Background

Interim Action

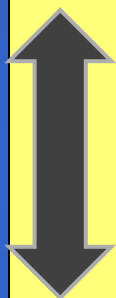
Method C Cleanup Level

Method A or B
Cleanup Level

*Human health risk of 10^{-6}
and Hazard Quotient =1,
or Natural Background
or Practical Quantitation Limit*

Sediment
Human Health

**Sediment
Regional
Background**



**Technical
possibility &
Recontamination**

Highest of:

- 1×10^{-6} Risk
- Natural Bkgd
- PQL

SMS

Sediment
Benthic toxicity

**Minimum Cleanup Level
(MCL)**



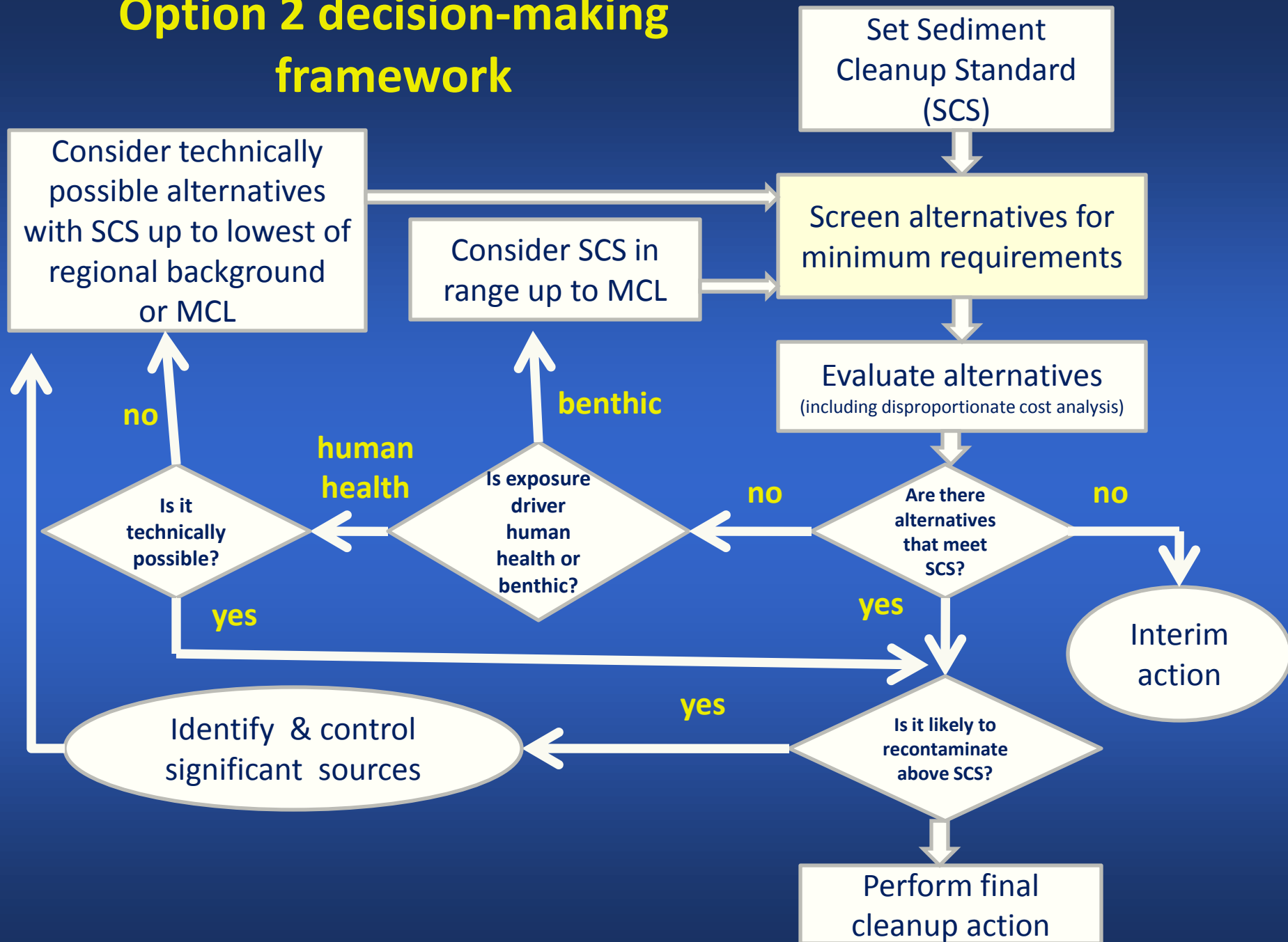
**Cost and
feasibility**

Minor effects

**Sediment Quality
Standards (SQS)**

No effects

Option 2 decision-making framework



Whew!

Anyone not yet confused??

Discussion

- Identify fatal flaws.
- Identify areas for further work.
- Other options we haven't considered.
- Ideas – especially good ones!

5 Options

Highest of:
• 1×10^{-6} Risk
• Natural Bkgd
• PQL

Regional Bkgd

↑↓

Highest of:
• 1×10^{-6} Risk
• Natural Bkgd
• PQL

**80 % of
Regional Bkgd**

↑↓

Highest of:
• 1×10^{-6} Risk
• Natural Bkgd
• PQL

**Highest of:
• 1×10^{-5} Risk
• Regional Bkgd**

↑↓

Highest of:
• 1×10^{-6} Risk
• Natural Bkgd
• PQL

Area Bkgd

↑↓

Highest of:
• 1×10^{-6} Risk
• Natural Bkgd
• PQL

